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14. ABSTRACT
Network Centric Warfare (NCW) is viewed as the bedrock of transformation and future warfighting (i.e., common operating picture, flattening command and control by connecting strategic level commanders to tactical level warfighters). However, the moral domain of conflict – having been largely ignored by NCW advocates – will in all likelihood prohibit its successful implementation at the lowest level of warfighting; the tactical level. Therefore, in future conflict, the author believes that it is this domain – the moral domain – that if not completely understood and taken into account, will limit, if not prevent, the full potential and exploitation of Network Centric Warfare as envisioned by its advocates. This research paper is relevant to the strategic, operational, and tactical levels of warfare in that NCW is clearly a major pillar in the quest for transformation of United States military forces. If the human dimension is a single point of failure in Network Centric Warfare, then the NCW concept needs to address this issue and identify the relationship and human interface required to successfully achieve and propel this future capability from a concept in its present form to a reality in its application.

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NETWORK CENTRIC WARFARE: A BRIDGE TOO FAR?

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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Introduction

Network Centric Warfare (NCW) is seen as a key pillar of military transformation that will revolutionize how military forces train, equip, and fight future wars. Many NCW advocates believe that "we are in the midst of a revolution in military affairs (RMA) unlike any seen since the Napoleonic Age, and it will prove to be the most important RMA to occur within the last 200 years."[1] The vast majority of research to date has focused on the concept of NCW and how advanced technology will enhance United States military forces ability to wage war. NCW advocates have stated how this visionary concept will alter, even transform, current doctrine and warfighting. In fact, many advocates opine a flattened C2 system in which, NCW will be able to bridge the current gap from the strategic level of war to the tactical level without a requirement for operational level C2.[2] Furthermore, these same advocates believe that NCW will reduce the amount of personnel and physical combat power required to overwhelm an adversary. While it is true that technology has continuously evolved throughout the history of warfare, one domain has not; the moral domain (human, physical, psychological, cognitive), which has remained unchanged – a constant – and will likely remain so forever.

Although the concept of NCW is seen as the bedrock of transformation and future warfighting (i.e., common operating picture, flattening command and control by connecting strategic level commanders to tactical level warfighters), the moral domain of conflict – having been largely ignored by NCW advocates – will in all likelihood prohibit its successful implementation at the lowest level of warfighting; the tactical level. Therefore, in future conflict, the author believes that it is this domain – the moral domain – that if not completely

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[1] Arthur K. Cebrowski, "Network-Centric Warfare: Its Origin and Future," Naval Institute Proceedings Online http://www.usni.org/Proceedings/Articles98/PROcebrowski.htm, internet, accessed 4 May 03.

understood and taken into account, will limit, if not prevent, the full potential and exploitation of Network Centric Warfare as envisioned by its advocates.

This research paper is relevant to the strategic, operational, and tactical levels of warfare in that NCW is clearly a major pillar in the quest for transformation of United States military forces. If the human dimension is a single point of failure in Network Centric Warfare, then the NCW concept needs to address this issue and identify the relationship and human interface required to successfully achieve and propel this future capability from a concept in its present form to a reality in its application. However, before we can address the relationship between the moral domain of conflict and how it will limit the full conceptual implementation of Network Centric Warfare, we must first define what NCW truly is.

What is Network Centric Warfare?

Imagine this scenario as described by a guest speaker during a recent symposium hosted by the Naval War College regarding the U.S. Navy's effort relating to transformation. A Marine element organized into several small cells has been forward deployed on a distant battlefield. One of the cell leaders pulls out a cell phone-type device and opens it up and activates the system. He is automatically logged-on and recognized within a fully automated and integrated command and control network. His position is automatically updated within a geographically digitized grid, and he receives his team's newly assigned mission. While executing his mission, the team locates an enemy force. The team leader enters the position of the enemy threat into his cell phone device. His request for fire support is correlated within a digitized weapons grid and a platform is automatically assigned to engage the target. Minutes later, the threat is attacked by a precision-guided weapon from the joint/coalition force and destroyed. The team leader enters the battle damage assessment into his cell phone

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[2] Erik J. Dahl, "Network Centric Warfare and The Death of Operational Art" (Naval War College), 3.

device and transmits the information throughout the networked command and control system providing near-real-time updates to commander's throughout the theater of operations, and to strategic and national command and control mediums. Having completed that mission, the Marine team leader receives another mission and continues to repeat the process. Now imagine the battlefield with hundreds of these teams moving rapidly and engaging enemy forces in near-real-time conditions with a sensor-to-shooter networked based command and control architecture. Does this sound like science fiction or does it sound like how future wars will be fought? Or both? This is in fact, just one advocates translation of network centric warfare as explained to the audience.

While conducting research on NCW, the author discovered the more one studies the concept of NCW, the more definitions one are exposed to. One of the reasons for so many different definitions of the NCW concept is because each of the armed services has different roles and missions, so naturally they will have a separate concept and philosophy as to how their particular service will implement NCW. Therefore, if one were to ask a hundred military professionals what they believed NCW to be, you would most likely receive a hundred different answers. Moreover, depending on which branch of the service you are in, the definition and level of granularity in the employment of NCW concepts change. Briefly let us look at NCW from the Department of Defense's perspective as well as each of the services. Following this review the author will discuss the primary focus (level of war) of network centric operations, as it is applicable to each of the services.

Although each of the services view NCW through their own warfighting doctrine, roles and missions, it is the overall joint vision of the Department of Defense (DoD) that best describes what NCW is, and its concept and the capabilities it is attempting to achieve.

Within the Department of Defense's Network Centric Warfare Report to Congress, NCW is described as a concept that "is no less than the embodiment of an Information Age transformation of the DoD…NCW moves the Department to the next level of Jointness as envisioned in Joint Vision 2020…NCW represents a powerful set of warfighting concepts and associated military capabilities that allow warfighters to take full advantage of all available information and bring all available assets to bear in a rapid and flexible manner."[3]

DoD's Congressional Report identifies several tenets of NCW. These tenants include a robust networked force that focuses on sharing of information resulting in an enhanced quality of information and situational awareness; a common situational awareness that permits collaboration and self-synchronization thereby increasing sustainability and speed of command; and, that the achievement of these tenets increases combat effectiveness.[4] The report is also up front about the work that is yet to be accomplished in order to fully develop the NCW concepts that will transform today's platform-centric weapon systems into network-centric weapons. This author believes that the real concern lays in which service(s), by virtue of their roles and missions, can best implement and integrate NCW down to the tactical level of war?

DoD's NCW strategy consists of three objectives. It is necessary to discuss these objectives because as the author will point out later, NCW advocates must consider the moral domain of conflict when developing a realistic strategy. The first objective involves setting priorities that will enable, develop and implement NCW concepts and capabilities. The

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[3] Ibid, i.
[4] Ibid

second objective is to establish goals and metrics to measure progress; and third, it is absolutely necessary to overcome impediments to NCW concepts and capabilities.[5]

DoD sees several impediments to transforming the force to NCW. These impediments include a lack of secure communications connectivity throughout the joint and coalition force, an intolerance of disruptive innovation, a lack of understanding of human and organizational behaviors, and finally, a lack of investment in NCW technologies.[6] DoD's report also provides evidence that "warfighters employing NCW concepts can leverage shared situational awareness and knowledge to achieve situational dominance and dramatically increase survivability, lethality, speed, timeliness, and responsiveness…and that the source of transformational combat power enabled by NCW concepts can only be understood by focusing on the relationships in warfare that take place simultaneously in and among the physical, the information, and the cognitive domains."[7] It is within these passages that the moral domain of conflict and the fact that it must be considered into the overall NCW equation begins to emerge. Let us briefly describe the three domains of network centric warfare: the physical domain, the information domain, and the cognitive domain.

The Physical Domain is the traditional domain of conflict. "It is where strike, protect, and maneuver occurs across the ground, sea, air, and space environments…and where physical platforms and the communications networks that connect them reside."[8]

The Information Domain is exactly what it sounds like – information. Within this domain, information is produced, influenced and distributed. It is this domain that provides

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[5] Ibid, ii.
[6] Ibid, iii.
[7] Ibid, iv.
[8] Ibid.

the mechanism to communicate information throughout the force – the command and control system.[9]

The Cognitive Domain consists "…of the mind of the warfighter…" and includes certain "…intangibles such as, leadership, morale, unit cohesion, training and experience, situational awareness and public opinion..." it is also "…the domain where commander's intent, doctrine, tactics, techniques, and procedures reside."[10] It is this domain that is the key to fully implementing the concept of NCW and the focus of this research paper.

Having discussed the concept of NCW from the overall joint perspective, let us now briefly look at each of the services concept of NCW.

Within the United States Navy, NCW is viewed as a futuristic concept that has yet to be defined or translated into an actual capability. Coined FORCEnet, it is "the architecture of warriors, weapons, sensors, networks, decision aids and supporting systems integrated into a highly adaptive, human-centric, comprehensive maritime system that operates from seabed to space, from sea to land."[11] Specifically, it is FORCEnet that will provide the maritime component with a fully interoperable, Single Integrated Operational Picture (SIOP) to include situational awareness of friendly and enemy ground/surface, air and space forces via a global information grid.[12] Multiple sensors feed into the grid to build this SIOP and include input from multiple platforms throughout the battlespace such as, aircraft, submarines, satellites, airborne Intelligence Surveillance and Reconnaissance (ISR)

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[9] Ibid.

[10] Ibid.

[11] Naval Transformation Roadmap, Power and Access…From the Sea, Sea Strike – Sea Shield – Sea Basing, 4.

[12] Ibid, 26.

platforms, ground-based sensors, etc. A networked grid of weapons systems will be employed to attack and destroy enemy forces.[13]

For the Marine Corps, NCW is really nothing new and is seen as business as usual. The doctrine, tactics, techniques and procedures (TTP) regarding how the Marine Air-Ground Task Force is organized and fights, by its design, is a network centric warfighting force and has been for years.[14]

The Army, in defining NCW has embraced the concept as envisioned through Joint Visions 2010/2020, which focuses "…on the potential of linking together networking, geographically dispersed combat elements…shared battlespace understanding and increased combat effectiveness through synchronized actions." Examples include collaborative and simultaneous planning among dispersed force elements, Command and Control (C2) on the move, split-based operations, virtual support services, and integrated ISR.[15]

The United States Air Force views NCW as leveraging information technologies into a robust network that is achieved through integrating information operations, battlespace awareness, and information transport and processing. They believe that dominating the information domain through the collection, control, exploitation and defense of information is key to successful NCW. Also, battlespace awareness is achieved by networking surface, airborne, and space surveillance systems.[16]

From the individual services perspective and DoD as a whole, what similarities of NCW does all share? From a holistic standpoint, NCW is a concept that will incorporate the following capabilities; a single integrated operational picture (SIOP), a fully networked C2

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[13] Cebrowski, 13.
[14] Department of Defense, "Network Centric Warfare," Report to Congress, 27 July 2001, http://www.dodccrp.org/NCW/NCW_report/report/ncw_appendix.pdf, internet; accessed, 4 May 03, A-8.
[15] Ibid, A-1.

system, a sensor-to-shooter capability, a flattened and streamlined C2 system, a fully integrated and web-based collaborative planning capability, a minimal footprint of forward deployed headquarters with a virtual reach-back capability, and finally, a bottom up self-synchronization system that gives small unit planners the ability to access senior commanders intent and operational planning documents. In addition to this DoD wide macro perspective on NCW, it is equally important to briefly discuss how NCW will be employed by each of the services in terms of levels of war.

How does the author see the applicability of NCW with regard to each of the services and their role in fighting future wars? The USAF has always fought primarily at the strategic (strategic attack, Intelligence Surveillance & Reconnaissance, Special Operation Forces, Airlift) and operational levels (Air Interdiction, Offensive Counter Air, Defensive Counter Air), and secondarily at the tactical level (Close Air Support). The United States Navy, since the end of the Cold War has no near competitor and the likelihood of conducting tactical engagements against another naval force on the high seas is extremely remote. Therefore, the Navy has transitioned to more of a strategic and operational force whose focus is on joint/combined operations rather than a naval force whose emphasis is at the tactical level. Today's Navy must be capable of projecting power and shaping the battlespace at sea and on land at the strategic and operational levels of war, and this appears to be the focus of their NCW concepts. Both the United States Army and the Marine Corps fight an entirely different way in comparison to the Navy and Air Force; they get up front and personal with the threat and although their combined efforts truly have strategic implications, their primary sphere of influence is at the operational and tactical levels of war, and it is at the tactical level of war where the challenges of implementing NCW concepts reside.

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[16] Ibid, A-15.

To briefly review then, NCW is the key to transformation according to its advocates? NCW will give warfighters the advantage to fight and win wars in much less time while requiring fewer forces in comparison what has been required in recent conflicts. Quite simply, NCW is designed to leverage technology in order to reduce footprint (personnel and equipment) and increase lethality. Its design is also intended to increase speed of command by compressing decision cycles. As a result, NCW will enable the U.S. military and coalition forces to become lighter/streamlined, better integrated, faster, and more lethal.

Clearly the application of NCW concepts will have its greatest impact at the highest levels of warfighting, that being the strategic and operational levels. However, at the tip of the spear – the tactical level of war – is where the human, the temporal, the cognitive, the moral domain of conflict clashes with the theory of network centric warfare. Is NCW applicable at the tactical level of war, or does the moral domain of conflict prevent its realization? In order to address this aspect, we must first define the moral domain, recognize its presence and influence on warfighting, and realistically look at the applicability of NCW at the tactical level and how it can either enhance or degrade fighting and winning at the tactical level of war.

What is the Moral Domain of Conflict?

Carl von Clausewitz has stated in his writing *On War* that "the moral elements are among the most important in war…" and that "One might say that the physical (aspects of warfare) seem little more than the wooden hilt, while the moral factors are the precious metal, the real weapon, the finely-honed blade."[17] What is the moral domain of conflict? The moral domain of conflict is that part of warfare that involves man, his mind and his

heart, and how conditions and multiple aspects of combat, such as, danger, hardship, and stress, affect his values and psychology.[18]

Throughout the history of warfare many factors have changed how men wage war. From the time of Frederick the Great where wars were decided through the conduct of individual battles, to the industrial age where technology such as the rifled barrel, the telegraph, the railroad and the aircraft revolutionized warfighting, and finally, to today's high tech employment of precision guided munitions and sophisticated command and control, one aspect has remained basically the same – a constant – throughout the evolution of warfare; that being the human aspect. Throughout the research of this topic, it was discovered that several different words are used to describe the human aspect of combat, and although there are several different ways of referring to human factors in combat they all generally agree on the same definition. The terms that describe human factors are often times referred to as cognitive, temporal, human, psychological or moral. For the purpose of this paper, the term "moral domain" will be utilized to refer to this sphere of warfighting.

What motivates men to fight? What makes them ineffective in combat? What makes certain military organizations better and more successful than others? The answers to these questions can be found in studying the dynamics of human behavior in combat – the moral domain of combat. There are several human factors and aspects of combat which affect how troops perform in a combat environment. Factors, such as group cohesion, and other aspects of combat all create stress and therefore influence combat behavior.

Throughout the history of warfare, a common theme among the world' foremost experts on the moral domain of conflict emerges. Subject matter experts, such as, Lord

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[17] Carl von Clausewitz, "On War" (Princeton, 1976), 184-184.
[18] Anthony Kellot, "Combat Motivation" (Kluwer – Nijhoff Publishing, 1982), x.

Moran in *The Anatomy of Courage*, SLA Marshall's *Men Against Fire*, John Baynes, *Morale: A Study of Men and Courage*, John Keegan's *The Face of Battle*, MajGen F.M. Richardson's *Fighting Spirit: A Study of Psychological Factors in War*, and Anthony Kellett's *Combat Motivation: The Behavior of Soldiers in Battle*, who have developed a comprehensive study of men in combat. All of their theories agree on one central theme, that "the group" is essential – "The group is a fundamental social situation. The average person, particularly one from an urban environment, has a more or less continuous association with groups of one sort or another – for example, childhood and adolescent gangs, school groups, athletic teams, fraternal organizations, occupational groups, social and service organizations, and churches."[19] What does this mean? Quite simply man is a social animal. He does not do well in isolation. SLA Marshall probably best captures the importance of the primary group in his comment that "I hold it to be one of the simplest truths of war that the thing which enables an infantry soldier to keep going with his weapons is the near presence or presumed presence of a comrade."[20] Without the group, an individual soldier who is isolated and on his own or is part of a much smaller isolated group without the feeling of safety or control will soon become combat ineffective.[21]

In order to further define the moral domain of conflict lets examine the various aspects of combat that influence the ability of the combat soldier to fight effectively. Although there are several aspects of combat that greatly affect individuals in combat, the most influential include fatigue, sustained operations, climate and terrain, campaigning conditions, and casualties.[22]

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[19] Ibid, 41-42.
[20] Ibid, 97-98.
[21] Ibid.
[22] Ibid, 236, 238, 242, 247, 263.

"One of the most evident hardships of campaigning is the physical and psychological fatigue it engenders." In combat, clearly one of the primary causes of fatigue is the loss of sleep. Other causes of fatigue include the physical rigors of combat such as long marches, and the extreme conditions of terrain and weather. [23] Sustained operations can lead to fatigue because of the tempo of operations, especially in a fast ground offensive and exploitation of early success is paramount; therefore, the longer the operation, the greater the strain on leaders, and on their individual fighting men.

The conditions of campaigning will increase the fatigue and strain on individual warfighters. These conditions include, but are not limited to the hardships associated with forward deployed forces in geographic locations that are extremely austere. Especially in today's world, where the majority of U.S. military personnel are accustomed to the basic necessities of life to include electricity, air conditioning/heat, fresh water, proper food and sanitation. The difficult adjustment to austere conditions to include a brutal climate, a lack of proper hygiene facilities, no means to communicate with family, and poor quality of food, all create fatigue, which ultimately leads to emotional stress and loss of combat effectiveness.

The Impact of Technology on the Moral Domain of Conflict

Just take a look at the impact of technology throughout the evolution of modern warfare and its impact on the moral domain of conflict. During the Napoleonic era, armies fought in mass formations and the size of the group and a soldier's proximity to one another was essentially shoulder-to-shoulder. The same holds true for both the American Revolutionary War and the Civil War. As technology revolutionized warfare, resulting in weapons with much greater accuracy, range and lethality, it transformed doctrine and tactics to the point that the basic tactical size of groups began to reduce in size. History has seen the

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[23] Ibid, 231.

basic maneuver size element shrink from armies to corps to regiments to battalions to companies to platoons. By WWII, the basic size of the smallest tactical organization was the rifle squad. Technology has given warfighters tremendous leverage in terms of manpower, thus an obvious trend or theory has emerged. Often times referred to as the "Empty Battlefield," whereas increases in technology has resulted in a reduction of combat troops to a point where the modern battlefield in nearly empty in comparison to earlier days of warfighting.[24]

NCW vs. the Moral Domain of Conflict

One of the intended consequences of NCW (and transformation) is the opportunity to redefine the size of the basic fighting force/element. Using the earlier example of a Marine team forward deployed, NCW advocates may very well believe the size of the basic fighting element can be limited to just a few individuals. However, there is a cause and effect relationship between NCW and the moral domain that must be considered. That relationship is this: with the technology associated with NCW concepts being pushed down to the lowest levels of warfighting, the requirement for warfighter can be reduced. However, fewer warfighters will result in a condition of isolation for the individual soldier, and as we have seen through the study of human behavior in combat, the more isolated the individual warfighter becomes, the less combat effective he is because of the stress associated with the loss of association and safety of the group.

The moral domain must also be considered in terms of information flow and the goal of "networking" every warfighter into the information grid for the purpose of increasing the speed of command and decision-making. "The dissemination of highly situational

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[24] Bruce Barrett, Clausewitz Here and Now: Military Obedience ;and Gestalt Theory http://g-g.org/gej/1-2/militarypart4.html, internet, accessed 7 May 03.

information is the responsibility of every combat soldier and junior leader since their own actions, if unexplained and misinterpreted, can cause their fellows to draw completely erroneous conclusions about the tactical situation…" and "a lack of authoritative information leads inevitably to speculation…" and "a lack of information concerning events of immediate and local significance can also produce panic."[25] NCW advocates must address the issue of accuracy, especially with regard to highly perishable information. History has demonstrated that combat information can be extremely inaccurate, especially when individuals are influenced by fatigue, isolation, and stress. Inaccurate information being entered into the information grid by multiple individuals will only add to the confusion and fog of war.

How do we solve this problem?

In order to fully exploit and implement the concept of Network Centric Warfare, advocates must take into consideration the behavior of men in battle and recognize that external and situational factors such as fear, danger, stress, and hardship will impact on the decisions/judgment of leaders and individual warfighters alike. Can the technology of NCW replicate the presence of another comrade close-by thereby eliminating or helping to overcome the fear of isolation? Time will tell, however, it is in the area of experimentation and exercises that emphasis must be placed. It is imperative to replicate the conditions that individual warfighters will experience in battle. Therefore, the moral domain of conflict must be introduced into future concept development if NCW is to be a validated concept throughout all levels of warfare. Furthermore, measures of effectiveness must be developed to assist in validation and concept development in order to catalog the degree of influence the moral domain has on NCW. The bottom line is that the NCW concept must take into consideration the moral/human realities of warfare.

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[25] Kellot, 227.

NCW advocates must also avoid the dangers of templating the NCW as "one size fits all." In other words, because NCW concepts may work at the tactical/operational level for one particular service, it may not be applicable to another since each service's roles and missions are different. NCW must compliment the roles, missions, service and joint doctrine throughout all of DoD at every level of warfare.

Conclusion

Technology is not the panacea to future war; understanding the human dimension and how to achieve a balance between man and technology is. "The temptation for modern armies to emphasize technology, even when justified by references to the combat-specific need for firepower and mobility, has had the following effect: While the motivational issues associated with manning the peacetime forces (e.g., the impact of the all-volunteer system, recruitment and retention, allocation, the role of women, the military family) have received considerable attention, the human requirements of combat have been given rather less consideration…" with claims that too much emphasis has been put "…on hardware and too little on the fighting quality of its soldiers."[26]

Network Centric Warfare will play a critical role in the transformation of the Department of Defense. In present form, NCW has its greatest impact at the strategic and operational levels of war, with limited application (despite what NCW advocates assert) at the tactical level, predominately residing with air and naval forces. However, NCW advocates must exercise caution and prudence. The moral domain of conflict must be considered because it is this domain, not the physical or informational domains of conflict that will dictate the size and scope of the NCW "box." "Human motivation and behavior remain the keys to combat effectiveness and to the fullest possible use of the sophisticated

weaponry and equipment that technology has placed in the hands of the soldier."[27] The

Department of Defense cannot ignore the moral domain of combat in Network Centric

Warfare and they would be wise to consider and be guided by Field Marshal Montgomery's

comments in describing his doctrine of command, in which he stated, "If the approach to the

human factor is cold and impersonal, then you achieve nothing."[28]

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[26] Kellot, xvii.
[27] Kellot, 336.
[28] Kellot, 336.

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